IN THE SPECIFICATION:

Please amend the specification as follows:

Please substitute the paragraph beginning at page 4, line 15, with the following.

-- The alignment apparatus using the above Z position detection means suffers from the following problems. --

Please substitute the paragraph beginning at page 5, line 17, and ending on page 6, line 3, with the following.

-- To solve the above problems, an exposure apparatus according to the present invention, having a projection optical system for projecting a pattern formed on a master onto a substrate, a stage capable of moving with respect to the projection optical system while holding at least ~~either object~~ one of the substrate and master, and a lens barrel support which supports the projection optical system, includes: an interferometer system having an interferometer for measuring a Z position and displacement of the stage with respect to the lens barrel support by using a Z measuring mirror which is arranged on the stage and has a reflecting surface substantially parallel to an XY plane. --

Please substitute the paragraph beginning at page 6, line 26, and ending on page 7, line 15, with the following.

-- In the exposure apparatus, the interferometer system desirably includes a plurality of interferometer systems arranged on the apparatus. The interferometer may be mounted on either of the stage and a movable portion which follows the stage. The stage may have an elongated mirror for Z measurement which is longer in the stroke direction of the movable portion which supports the interferometer, and the elongated mirror for Z measurement may use the upper surface of either of the X and Y measuring mirrors. In the interferometer system, measurement light emitted by the interferometer may strike the Z measuring mirror via a plurality of mirrors or prisms attached to the lens barrel support serving as a measurement reference. Measurement light incident on the Z measuring mirror is preferably almost perpendicular to the reflecting surface. --

Please substitute the paragraph beginning at page 7, line 25, and ending on page 8, line 7, with the following.

-- An exposure apparatus according to the present invention comprises a Y stage movable in a Y direction; an X stage movable in an X direction with respect to the Y stage; a Z mirror which is mounted on the X stage or Y stage and has a reflecting surface parallel to an XY plane; a mirror or prism for guiding to the Z mirror a beam emitted ~~to~~ in a Z direction by the Y stage; and an interferometer for detecting a Z position of the X stage or Y stage by using the beam reflected by the Z mirror. --

Please substitute the paragraph beginning at page 9, line 2, with the following.

-- A semiconductor device manufacturing method according to the present invention comprises the steps of installing a plurality of semiconductor manufacturing apparatuses, including any one of the above-described exposure apparatuses, in a semiconductor manufacturing factory, and manufacturing a semiconductor device by using the plurality of semiconductor manufacturing apparatuses. --

Please substitute the paragraph beginning at page 9, line 10, with the following.

-- Preferably, ~~in~~ the semiconductor device manufacturing ~~method,~~ method further comprises the steps of connecting the plurality of semiconductor manufacturing apparatuses to a local area network; connecting the local area network to an external network outside the semiconductor manufacturing factory; acquiring information about the exposure apparatus from a database on the external network by using the local area network and the external network; and controlling the exposure apparatus on the basis of the acquired information. --

Please substitute the paragraph beginning at page 9, line 21, and ending on page 10, line 3, with the following.

-- Preferably, in the semiconductor device manufacturing method, a database provided by a vendor or user of the exposure apparatus is accessed via the external network, thereby obtaining maintenance information of the manufacturing apparatus by data communication, or data communication is performed between the semiconductor manufacturing factory and another

semiconductor manufacturing factory via the external network, thereby performing production management. --

Please substitute the paragraph beginning at page 14, line 11, with the following.

-- Reference numerals 21 and 22 denote Z measuring mirrors fixed to the lens barrel to support 35; and 39, a movable mirror for Z measurement which has two reflecting surfaces and is integrated with a Y mirror 29 (~~to~~ which is shown in Fig. 1 and will be described later). --

Please substitute the paragraph beginning at page 16, line 10, with the following.

-- In Fig. 1, the wafer chuck 26 supports a wafer (not shown). The top stage 27 supports the wafer chuck 26. The top stage 27 moves a long stroke in the X and Y directions by a guide and an actuator (neither is shown), and moves a short stroke in the Z direction and rotational directions $\omega X$, $\omega Y$, and $\theta$. --

Please substitute the paragraph beginning at page 17, line 15, with the following.

-- The interferometers 23 and 24 are fixedly supported by a support (not shown) serving as a measurement reference. For example, the laser interferometers 23 and 24 are fixed to the lens barrel support, which is a structure integrated with the projection lens 34. --

Please substitute the paragraph beginning at page 19, line 21, and ending on page 20, line 14, with the following.

The positions of the mirrors 28 and 29, i.e., the initial position of the top stage 27 is stored in a control unit (not shown). The current position of the top stage 27 is obtained by adding the displacements of the mirrors 28 and 29 measured by the laser interferometers to the initial position. The X- and ~~Y~~ Y-positions of the top stage 27 are measured by the interferometers 23a and 24a. The rotational amount of the top stage 27 in the $\theta$ direction is measured by detecting the different between the detection values of the laser interferometers 23b and 23c and performing arithmetic processing by the control unit. The rotational amount of the top stage 27 in the $\omega X$ direction is measured by detecting the difference between the detection values of the laser interferometers 24a and 24b (or 25a and 25b) and performing arithmetic processing within the control box. --

Please substitute the paragraph beginning at page 28, line 4, with the following.

-- The third embodiment can eliminate the need for mounting an interferometer on a Y stage 31, and can implement a lightweight, high-rigidity Y stage. Since the Y stage 31, which supports the optical element 51 moves in the Y direction, the optical element 51 need not be an elongated mirror, unlike the mirrors 21, 22 and 28 to 30. --

Please substitute the paragraph beginning at page 28, line 14, with the following.

-- A production system for producing a semiconductor device (e.g., a semiconductor chip such as an IC or LSI, a liquid crystal panel, a CCD, a thin-film magnetic head, a micromachine, or the like) by the exposure apparatus according to the present invention will be exemplified. a trouble remedy or periodic maintenance of a manufacturing apparatus installed in a semiconductor manufacturing factory, or maintenance service such as software distribution is performed by using a computer network outside the manufacturing factory. --

Please substitute the paragraph beginning at page 28, line 24, and ending on page 29, line 19, with the following.

-- Fig. 8 shows the overall system cut out at a given angle. In Fig. 8, reference numeral 101 denotes a business office of a vendor (e.g., an apparatus supply manufacturer), which provides a semiconductor device manufacturing apparatus. Examples of the manufacturing apparatus are semiconductor manufacturing apparatuses for performing various processes used in a semiconductor manufacturing factory, such as pre-process apparatuses, a resist processing apparatus, and an etching apparatus, an annealing apparatus, a film formation apparatus, a planarization apparatus, and the like) and post-process apparatuses (e.g., an assembly apparatus, an inspection apparatus, and the like). The business office 101 comprises a host management system 108 for providing a maintenance database for the manufacturing apparatus, a plurality of operation terminal computers 110, and a LAN (Local Area Network) 109, which connects the host management system 108 and computers 110 to build an intranet. The host management

system 108 has a gateway for connecting the LAN 109 to Internet 105 as an external network of the business office, and a security function for limiting external accesses. --

Please substitute the paragraph beginning at page 29, line 20, and ending on page 31, line 6, with the following.

-- Reference numerals 102 to 104 denote manufacturing factories of the semiconductor manufacturer as users of manufacturing apparatuses. The manufacturing factories 102 to 104 may belong to different manufacturers or the same manufacturer (e.g., a pre-process factory, a post-process factory, and the like). Each of the factories 102 to 104 is equipped with a plurality of manufacturing apparatuses 106, a LAN (Local Area Network) 111, which connects these apparatuses 106 to construct an intranet, and a host management system 107 serving as a monitoring apparatus for monitoring the operation status of each manufacturing apparatus 106. The host management system 107 in each of the factories 102 to 104 has a gateway for connecting the LAN 111 in the factory to the Internet 105 as an external network of the factory. Each factory can access the host management system 108 of the vendor 101 from the LAN 111 via the Internet 105. The security function of the host management system 108 authorizes access of only a limited user. More specifically, the factory notifies the vendor via the Internet 105 of status information (e.g., the symptom of a manufacturing apparatus in trouble) representing the operation status of each manufacturing apparatus 106, and receives response information (e.g., information designating a remedy against the trouble, or remedy software or data) corresponding to the notification, or maintenance information such as the latest software or help information.

Data communication between the factories 102 to 104 and the vendor 101 and data communication via the LAN 111 in each factory adopt a communication protocol (TCP/IP) generally used in the Internet. Instead of using the Internet as an external network of the factory, a dedicated network (e.g., an ISDN) having high security, which inhibits access of a third party, can be adopted. Also, the user may construct a database in addition to the one provided by the vendor and set the database on an external network, and the host management system may authorize access to the database from a plurality of user factories. --

Please substitute the paragraph beginning at page 31, line 7, and ending on page 32, line 27, with the following.

-- Fig. 9 is a view showing the concept of the overall system of this embodiment that is cut out at a different angle from Fig. 8. In the above example, a plurality of user factories having manufacturing apparatuses and the management system of the manufacturing apparatus vendor are connected via an external network, and production management of each factory or information of at least one manufacturing apparatus is communicated via the external network. In the example of Fig. 9, a factory having manufacturing apparatuses of a plurality of vendors and the management systems of the vendors for these manufacturing apparatuses are connected via the external network of the factory, and maintenance information of each manufacturing apparatus is communicated. In Fig. 9, reference numeral 201 denotes a manufacturing factory of a manufacturing apparatus user (semiconductor device manufacturer) where manufacturing apparatuses for performing various processes, e.g., an exposure apparatus 202, a resist processing

apparatus 203, and a film formation apparatus 204 are installed in the manufacturing line of the factory. Fig. 9 shows only one manufacturing factory 201, but a plurality of factories are networked in practice. The respective apparatuses in the factory are connected to a LAN 206 to build an intranet, and a host management system 205 manages the operation of the manufacturing line. The business offices of vendors (e.g., apparatus supply manufacturers), such as an exposure apparatus manufacturer 210, a resist processing apparatus manufacturer 220, and a film formation apparatus manufacturer 230 comprise host management systems 211, 221, and 231 for executing remote maintenance for the supplied apparatuses. Each host management system has a maintenance database and a gateway for an external network, as described above. The host management system 205 for managing the apparatuses in the manufacturing factory of the user, and the management systems 211, 221, and 231 of the vendors for the respective apparatuses are connected via the Internet or dedicated network serving as an external network 200. If a trouble occurs in any one of a series of manufacturing apparatuses along the manufacturing line in this system, the operation of the manufacturing line stops. This trouble can be quickly solved by remote maintenance from the vendor of the apparatus in trouble via the Internet 200. This can minimize the ~~stop~~ stoppage of the manufacturing line. --

Please substitute the paragraph beginning at page 33, line 1, and ending on page 34, line 6, with the following.

-- Each manufacturing apparatus in the semiconductor manufacturing factory comprises a display, a network interface, and a computer for executing network access software and apparatus

operating software, which are stored in a storage device. The storage device is a built-in memory, hard disk, or network file server. The network access software includes a dedicated or general-purpose web browser, and provides a user interface having a window as shown in Fig. 10 on the display. While referring to this window, the operator who manages manufacturing apparatuses in each factory inputs, in input items on the windows, pieces of information such as the type of manufacturing apparatus (401), serial number (402), subject of trouble (403), occurrence date (404), degree of urgency (405), symptom (406), remedy (407), and progress (408). The pieces of input information are transmitted to the maintenance database via the Internet, and appropriate maintenance information is sent back from the maintenance database and displayed on the display. The user interface provided by the web browser realizes hyperlink functions (410 to 412), as shown in Fig. 10. This allows the operator to access detailed information of each item, to receive the latest-version software to be used for a manufacturing apparatus from a software library provided by a vendor, and to receive an operation guide (help information) as a reference for the operator in the factory. Maintenance information provided by the maintenance database also includes information concerning the features of the above-described embodiments. The software library also provides the latest software for implementing the features of the above-described embodiments. --

Please substitute the paragraph beginning at page 34, line 7, and ending on page 35, line 6, with the following.

-- A semiconductor device manufacturing process using the above-described production system will be explained. Fig. 11 shows the flow of the whole manufacturing process of the semiconductor device. In step 1 (circuit design), a semiconductor device circuit is designed. In step 2 (mask formation), a mask having the designed circuit pattern is formed. In step 3 (wafer formation), a wafer is formed by using a material such as silicon. In step 4 (wafer process), called a pre-process, an actual circuit is formed on the wafer by lithography using the prepared mask and wafer. Step 5 (assembly), called a post-process, is the step of forming a semiconductor chip by using the wafer formed in step 4, and includes an assembly process (dicing and bonding) and a packaging process (chip encapsulation). In step 6 (inspection), the semiconductor device manufactured in step 5 undergoes inspections such as an operation confirmation test and a durability test. After these steps, the semiconductor device is completed and shipped (step 7). For example, the pre-process and post-process are performed in separate dedicated factories, and each of the factories receives maintenance by the above-described remote maintenance system. Information for production management and apparatus maintenance is communicated between the pre-process factory and the post-process factory via the Internet or dedicated network. --

Please substitute the paragraph beginning at page 35, line 7, and ending on page 36, line 2, with the following.

-- Fig. 12 shows the detailed flow of the wafer process. In step 11 (oxidation), the wafer surface is oxidized. Instep 12 (CVD), an insulating film is formed on the wafer surface. In step 13 (electrode formation), an electrode is formed on the wafer by vapor deposition. In step 14 (ion implantation), ions are implanted in the wafer. In step 15 (resist processing), a photosensitive agent is applied to the wafer. In step 16 (exposure), the above-mentioned exposure apparatus exposes the wafer to the circuit pattern of a mask. In step 17 (developing), the exposed wafer is developed. In step 18 (etching), the resist is etched except for the developed resist image. In step 19 (resist removal), an unnecessary resist after etching is removed. These steps are repeated to form multiple circuit patterns on the wafer. A manufacturing apparatus used in each step undergoes maintenance by the remote maintenance system, which prevents a trouble in advance. Even if a trouble occurs, the manufacturing apparatus can be quickly recovered. The productivity of the semiconductor device can be increased in comparison with the prior art. --